THE NEOTROPIC SPECIES OF XANTHOPIMPLA
(HYMENOPTERA: ICHNEUMONIDAE)

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ABSTRACT—There is a key to all the known Neotropic species of *Xanthopimpla* Saussure, synonymy, descriptions, distributional data, and figures of propodea. The names *olfersi* Krieger and *phoenicura* Krieger are synonymized with *aurita* Krieger. *X.* **rhabdomera**, from Brazil, is described as new.

Xanthopimpla Saussure, 1892, is a tropical genus, represented in the Old World by about 300 species, and about 20 species groups. In the New World there is only one species group with 5 known species. The genus is easy to recognize, containing stout-bodied ephialtines of lemon-yellow color (rarely fulvous or ferruginous), usually with black spots on the thorax and abdomen, and often with black markings on the hind leg. The mandible is quite narrow at the tip, with only its upper tooth visible from front view, the lower tooth being shorter and behind the upper tooth. The clypeus is divided across the middle by a transverse suture. The hosts of *Xanthopimpla* are lepidopterous pupae.

All the Neotropic species may be included in a single species group, which is here called the Aurita Group. Krieger recognized 7 species of *Xanthopimpla* in the Neotropic Region (1914. Arch. f. Naturgesch. (A) 80 (6 & 7)). One of them (*macrura* Krieger) was based on a mislabeled specimen of the Oriental *X. regina* Morley (see Townes, 1961. Proc. Ent. Soc. Washington 63: 175). The other 6 are in the treatment below, two of them as synonyms.

The present author, and Miss Shui-Chen Chiu are working on a revision of the Indo-Australian species of *Xanthopimpla*, financed by a grant from the National Science Foundation. As a by-product of this investigation the small number of Neotropic species is reported upon here. I am indebted to the National Science Foundation for financial support, to Dr. E. Königsmann for loan of the Krieger material in the Berlin museum, to Dr. Max Fischer for loan of a Krieger type in Vienna, to Dr. Howard Evans for loan of specimens at Cambridge, to Dr. W. R. M. Mason for loan of those at Ottawa, and to Miss Luella Walkley for loan of those at Washington. The drawings were made under the supervision of Prof. Masaaki Tokunaga, of Kyoto.

DESCRIPTION OF THE AURITA GROUP

Front wing 6.4 to 11.5 mm. long. Body stout. Dorsal part of occipital carina present or absent. Lower front corner of pronotum a sharp angle of about 115°. Mesoscutum covered with hairs that arise from small punctures, the setiferous punctures separated by about 0.7 the length of the hairs. Notaulus reaching to

an imaginary line connecting the front 0.3 of tegulae, the crest at its front end moderately high to very high. Mesopleurum with sparse hairs on most of its surface, the punctures on its lower front third small and weak, separated by about 4 times their diameter. Lower part of mesopleurum without a sternaulus-like horizontal furrow. Postpectal carina a high crescentic flange, the flange with a shallow notch at center. Scutellum evenly convex, its lateral flanges rather low, reaching to or nearly to apex, gradually becoming lower posteriad. Middle and hind tibiae with 3 to 7 preapical bristles. Largest bristle of tarsal claws uniformly pale-colored and not expanded near apex. Areolet complete, receiving second recurrent vein about 0.35 from its apex. Nervulus opposite basal vein. Brachiella pigmented 0.1 to 0.8 the distance to wing margin. First tergite of moderate proportions, its dorsolateral carina complete or mostly complete, its median dorsal carinae ending between spiracle and the oblique grooves. Ovipositor sheath 0.33 to 1.1 as long as hind tibia. Ovipositor tip weakly decurved, its dorsal valve with distinct transverse ridges.

This species group is confined to the Neotropic Region. Five species are known, as treated below.

KEY TO THE NEOTROPIC SPECIES OF **Xanthopimpla** (AURITA GROUP)

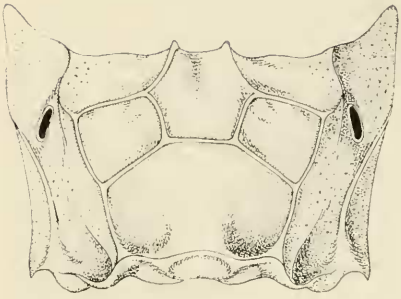
1. Propodeum with only the apical transverse carina present (fig. 5); abdomen entirely yellow ..... 5. **peruana** Krieger
   Propodeum with both basal and apical transverse carinae (figs. 1–4); abdomen usually with brown or black markings 2
2. Dorsal part of occipital carina lacking; ovipositor sheath about 1.1 as long as hind tibia; mesepimeron and stripe on front edge of mesopleurum nearly always dark brown ..... 3. **aurita** Krieger
   Dorsal part of occipital carina present (but weak); ovipositor sheath 0.33 to 0.70 as long as hind tibia; mesepimeron and front edge of mesopleurum entirely yellow, or sometimes the dorsal end of mesepimeron brown 3
3. Outer side of second lateral area of propodeum completely open (fig. 4); hind femur with a brown stripe on front side ..... 4. **rhabdomera**, n. sp.
   Outer side of second lateral area of propodeum partly or entirely closed by a carina (figs. 1 and 2); hind femur entirely yellow or striped with black 4
4. Areola separated from second lateral area by a complete or subcomplete carina; hind first trochanter and nearly always also hind coxa marked with blackish ..... 1. **craspedoptera** Krieger
   Areola confluent with second lateral area; hind first trochanter and hind coxa entirely yellow ..... 2. **spiloptera** Krieger

1. **Xanthopimpla craspedoptera** Krieger

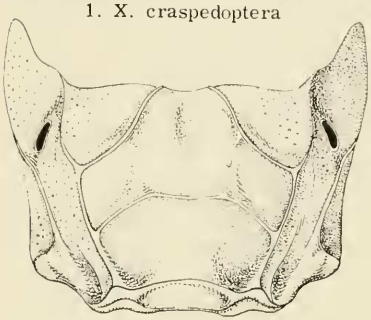
(Fig. 1)

Xanthopimpla craspedoptera Krieger, 1914. Arch. f. Naturgesch. (A) 80 (6): 26. key; (A) 80 (7): 67. ♀. description, figures. Type: ♀, Colombia: Bogotá (Berlin).

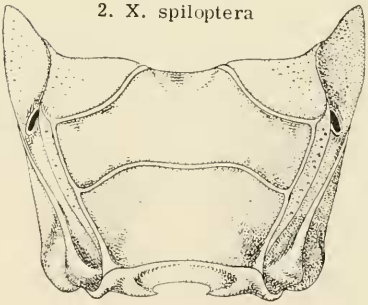
Front wing 6.4 to 8.5 mm. long. Occipital carina complete above (but weak). Transverse crests at front end of mesoscutum high. Lateral flange of scutellum about 0.25 as high at its midlength as the flagellum is wide. Propodeum as in



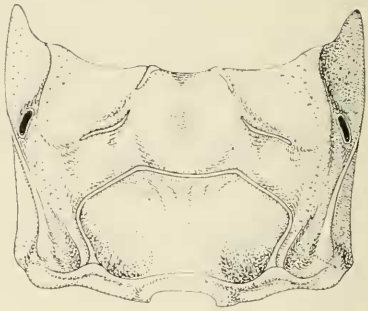
1. X. craspedoptera



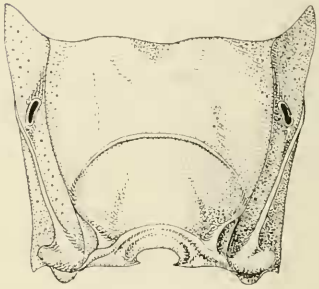
2. X. spiloptera



3. X. aurita



4. X. rhabdomera



5. X. peruana

Figs. 1–5. Propodea of the Neotropic species of *Xanthopimpla*.

fig. 1. Ovipositor sheath 0.33 to 0.44 as long as hind tibia. Ridges on ovipositor tip moderately numerous and moderately strong.

Yellow, with variable dark markings, typically as follows: Ocellar area, often two small spots on occiput, band on center of mesoscutum, short band in front of scutellum, band on base of propodeum, hind half of tegula, spot on upper division of metapleurum, often a stripe on under side of middle femur, spot on front side of hind coxa, basal part of middle and hind first trochanter, small stripe on front and larger stripe on hind face of hind femur, and bands on all

tergites, black. Scape and pedicel usually brownish above. Flagellum brown to blackish, paler at base and at extreme apex. Upper end of mesepimeron sometimes brown. Wings with a weak tinge of yellowish brown, the apical margin of front wing faintly to moderately infuscate. Ovipositor sheath yellowish, brownish near apex.

Sometimes the mesosternum is marked with black. The blackish markings on the legs are variable and sometimes absent. The small black spot on upper division of metapleurum is a characteristic color marking for the species, but sometimes this is absent. Often some of the abdominal bands are brown rather than black, or the basal and apical ones may be lacking. Some of the hairs on the legs and abdomen may be brown.

Specimens: ♀ (type), Bogotá, Colombia, Lindig (Berlin). ♀, Puerto Libre, Dept. Choco, Colombia, Dec. 17, 1967, C. A. Triplehorn (Townes). ♀, Turrialba, Costa Rica, May 21, Heyne (Berlin). ♂, 3 ♀, Turrialba, Costa Rica, Aug., 1963, C. C. Porter (Cambridge). ♀, Coca, Ecuador, May, 1965, Luis Peña (Townes). ♀, Barro Colorado Is., Canal Zone, Panama, 1956, C. W. & M. E. Rettenmeyer (Ottawa). ♀, Caño Saddle, Gatun Lake, Panama, May 3, 1923, R. C. Shannon (Washington). ♀, Avispas (near Marcapata), Peru, Sept., 1962, Luis Peña (Townes). ♀, Quincemil, Peru, Oct. 20–30, 1962, Luis Peña (Townes). ♀, Tingo Maria, Peru, Oct. 5–12, 1964, C. C. Porter (Cambridge). ♀, "South America" (Berlin).

This species ranges from Costa Rica to Peru.

2. **Xanthopimpla spiloptera** Krieger
(Fig. 2)

Xanthopimpla spiloptera Krieger, 1914. Archiv. f. Naturgesch. (A) 80 (6): 26. key; (A) 80 (7): 69. ♀. description, figures. Type: ♀, Brazil (Vienna).

Front wing 8.0 to 9.5 mm. long. Occipital carina complete dorsally (but weak). Transverse crests at front end of mesoscutum high. Propodeum as in fig. 2. Lateral flange of scutellum about 0.35 as high at its midlength as the width of flagellum. Ovipositor sheath 0.66 to 0.70 as long as hind tibia. Transverse ridges on ovipositor tip of moderate number and strength.

Yellow. Ocellar area, sometimes two spots on occiput, a transverse row of 3 adjacent spots across center of mesoscutum, short band in front of scutellum, band at base of propodeum, and hind half of tegula, black. Scape and pedicel yellow, tinged with brown above. Flagellum yellowish, brownish yellow near middle, its apical 0.4 blackish brown with the tip light brown. Wings subhyaline, the apex of front wing weakly infuscate. Abdomen of type with a dark brown, wedge-shaped mark, covering area near spiracle on each side of tergite 1, and central part of all tergites fulvous brown. Abdomen of specimen from Nova Teutonia yellow with a black band on tergites 3–5. Ovipositor sheath blackish, brown basally.

Specimens: ♀ (type), "Br." and an illegible word (Berlin). ♀, Nova Teutonia, Santa Catarina, Brazil, Mar. 20, 1948, Fritz Plaumann (Townes).

3. **Xanthopimpla aurita** Krieger

(Fig. 3)

Xanthopimpla phoenicura Krieger, 1914. Arch. f. Naturgesch. (A) 80 (6): 25. key; (A) 80 (7): 64. ♀. description, figures. Type: ♀, Brazil (Vienna). **New synonym.**

Xanthopimpla olfersi Krieger, 1914. Arch. f. Naturgesch. (A) 80 (6): 26. key; (A) 80 (7): 66. ♀. description. Type: ♀, Brazil (Berlin). **New synonym.**

Xanthopimpla aurita Krieger, 1914. Arch. f. Naturgesch. (A) 80 (6): 26. key; (A) 80 (7): 71. ♀. description, figures. Type: ♀, Bolivia: Mapiri (Berlin).

Front wing 7.7 to 11.5 mm. long. Occipital carina lacking from upper 0.35 of its normal circle. Transverse crests at front end of mesoscutum very high. Lateral flange of scutellum about 0.33 as high at its midlength as the flagellum is wide. Propodeum about as in fig. 3, the areola sometimes separated from second lateral area by a partial carina and the carina closing outer side of second lateral area sometimes incomplete or absent. Ovipositor sheath about 1.1 as long as hind tibia. Transverse ridges on ovipositor tip numerous and strong.

Yellowish with variable darker markings, typically as follows: Ocellar area, two spots on occiput, band on center of mesoscutum, short band in front of scutellum, band at base of propodeum, hind 0.4 of tegula, front margin of mesopleurum, mesepimeron, pleural margins of sockets of middle and hind coxae, spot on lower part of base of hind coxa, spot on lower part of first hind trochanter, stripe on under side of middle and hind femora, and irregular area on each side of first tergite basad of the oblique grooves, dark brown. Scape and pedicel light brown, yellowish below. Flagellum brown, its subapical portion blackish. Hind femur with some indefinite fulvous or light brown areas. Wings tinged with brownish, the apex of front wing faintly darkened. Central part and spiracular area of tergites 2 and following fulvous to dark brown. Ovipositor sheath light brown, darker near apex.

The stripes on the femora are sometimes lacking and sometimes the dark brown pleural markings are reduced or lacking. The dark brown mesepimeron and front margin of mesopleurum, though sometimes lacking, are a characteristic of the species.

Specimens: ♀ (type of *aurita*), Bolivia, bought from Staudinger (Berlin). ♀ (type of *olfersi*), Brazil, Olfers (Berlin). ♀ (type of *phoenicura*), Brazil, Beske (Vienna). ♀, Campina Grande (near Curitiba), Brazil, Feb. 17, 1966, H. & M. Townes (Townes). ♀, Capital, São Paulo, Brazil, John Lane (Cambridge). 2 ♂, 4 ♀, Reprêsa do Rio Grande, Guanabara, Brazil, Jan., June, Oct., & Nov., 1966 & 1967, M. Alvarenga (Townes). ♂, 5 ♀, Rio de Janeiro, Brazil, March 4, 5, & 6, 1966, H. & M. (Townes). 5 ♀, Rio de Janeiro, Brazil, Sept. 1938 & Jan. 1939, R. C. Shannon (Washington). ♀, Monteverde, Costa Rica, Jan. 5, 1962, Charles Palmer (Townes). ♂, Turrialba, Costa Rica, 1963, C. C. Porter (Cambridge). ♀, Mexico, Sept. 31, collector's name illegible (Berlin). ♀, Ancon, Canal Zone, Panama, Aug. 6, 1924, N. Banks (Cambridge). ♀, Barro Colorado Is., Canal

Zone, Panama, Mar. 22, 1937, S. W. Frost (Washington). ♀, Barro Colorado Is., Canal Zone, Panama, July 16, 1924, N. Banks (Cambridge). ♀, Caño Saddle, Gatun Lake, Panama, May 3, 1923, R. C. Shannon (Washington). ♂, reared from pupa of *Alabama argillacea*, Guacara, Venezuela, June 30, 1943, C. H. Ballou (Washington). ♀, El Valle, Districto Federal, Venezuela, July 18, 1939, G. Vivas Berthier (Townes). ♀, "Santigo Maria, May 16, 1954, M. S. V." (Washington).

This species ranges from Mexico to southern Brazil. In the author's experience, adults occur in low dense herbage, along the edges of damp forests.

4. **Xanthopimpla rhabdomera**, n. sp.
(Fig. 4)

Front wing 8.2 to 9.2 mm. long. Occipital carina complete above (but weak). Transverse crests at front end of mesoscutum high. Lateral flange of scutellum about 0.2 as high at its midlength as the flagellum is wide. Propodeum as in fig. 4. Ovipositor sheath 0.40 to 0.47 as long as hind tibia. Transverse ridges on ovipositor tip few and weak.

Yellow. Ocellar area, two spots on occiput, band across center of mesoscutum and a shorter one in front of scutellum, hind 0.4 of tegula, band across base of propodeum, band on tergites 1 and 3–6, and usually band on tergite 2, black. The band on tergite 1 (when present), turned forward at the sides, and often this band brown rather than black. Central part of base of tergite 7 brown. Scape and pedicel often brown above. Flagellum blackish brown, yellowish at base. Front side of hind coxa often with a brown area. Front side of hind femur with a broad brown stripe. Last segment of middle tarsus brownish apically. Last segment of hind tarsus brown. Wings tinged with brownish, the apex of front wing infuscate. Ovipositor sheath black.

Type: ♀, Nova Teutonia, Santa Catarina, Brazil, Dec. 18, 1952, Fritz Plaumann (Townes).

Paratypes: ♀, same data as type but dated Jan. 12, 1953 (Townes). 2 ♀, Nova Teutonia, 27° 11′ S., 52° 23′ W., 300–500 m., Fritz Plaumann (Ottawa).

5. **Xanthopimpla peruana** Krieger
(Fig. 5)

Xanthopimpla peruana Krieger, 1914. Arch. f. Naturgesch. (A) 80 (6): 25. Key; (A) 80 (7): 73. ♂, ♀. description, figures. Lectotype: ♀, Peru: Dept. Cuzco (Berlin). Lectotype designated by Townes & Townes, 1966.

Front wing 7.6 to 8.2 mm. long. Occipital carina complete dorsally (but weak). Transverse crests at front end of mesoscutum of medium height. Lateral flange of scutellum about 0.17 as high at its midlength as the flagellum is wide. Propodeum as in fig. 5. Ovipositor sheath about 0.60 as long as hind tibia. Transverse ridges on ovipositor tip moderately strong and moderately numerous.

Yellow. Ocellar area, transverse band on middle of mesoscutum and a shorter one in front of scutellum, black. Hind half of tegula brown. Scape and pedicel brownish, yellow below. Flagellum black, brownish at base. Fifth segment of hind tarsus brown. Wings subhyaline, the apex of front wing infuscate. Ovipositor sheath black, its base brownish.

Specimens: ♂, 4 ♀ (lectotype ♀ and paratypes), Dept. Cuzco, Peru, Carlepp, (Berlin). ♀ (paratype), "Cajon, Bergland," 1500 m., Dept. Cuzco, Peru, May 1, 1901, Carlepp (Berlin). ♀, Abitagua, 1200 m., Ecuador, May 27, 1939, Wm. Clarke-MacIntyre (Townes).

MATING AND OVIPOSITION BEHAVIOR OF THE COFFEE LEAF MINER, LEUCOPTERA COFFEELLA[1]

(Lepidoptera: Lyonetiidae)

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ABSTRACT—Observations were made on the mating and oviposition habits of the coffee leaf miner, *Leucoptera coffeella* (Guerin-Menevilla), in Puerto Rico, El Salvador and Guatemala. Mating takes place at mid-morning under conditions of reduced light and gentle air movement. Oviposition occurs only on coffee leaves, and the leaves of the third and fourth whorl are preferred. Oviposition occurs at dusk and is accompanied by darkness and gentle upward air movement.

The coffee leaf miner, *Leucoptera coffeella* (Guerin-Menevilla), is a serious pest in the coffee producing areas of the new world. The mines formed by larvae feeding interrupts carbohydrate production in leaves by the extensive damage to parenchyma tissue, and multiple infestations cause defoliation. The life history of other species of this genus has been reported by Crowe (1964), and this species is reported by Castillo (1964).

In Puerto Rico, the life cycle is approximately 36 days. Egg development requires from 5 to 7 days, the four larval stages require 16 to 21 days, and the pupal stage from 7 to 14 days, and the adult may live as long as 14 days. The duration of various life stages is dependent upon temperature. Population increase occurs in local outbreaks during the early summer months in Puerto Rico. When conditions become ideal for development, the larval population builds up rapidly.

More than 100 mating observations were made in Las Marías, Puerto Rico and 30 were made in El Salvador, Central America. Over 200 observations were made of oviposition in Guatemala and El Salvador, and more than 50 in Las Marías, Puerto Rico. Mating observations were also made in the laboratory at the Instituto Nacional del Café in Santa Tecla, El Salvador.

Mating Behavior.—Mating takes place late in the morning after

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[2] Chief Scientist and Research Assistant respectively.